



## **AMENDMENTS TO THE CLAIMS:**

The listing of claims will replace all prior versions, and listings of claims in the application:

### **LISTING OF THE CLAIMS**

Please cancel claims 1, 19, 20 and 24 without prejudice and amend claims 2-10 and 17.

Please add new claims 25 and 26.

1. (Canceled)
2. (Currently amended) A method according to claim [[1]] 21 in which the soluble solid is a salt, and the solvent is water.
3. (Currently amended) A method according to claim [[2]] 21 in which the solid is cesium chloride.
4. (Currently amended) A method according to claim [[1]] 21 in which the substrate comprises an SiO<sub>2</sub> layer on silicon.
5. (Currently amended) A method according to claim [[1]] 21 in which the substrate comprises gallium arsenide, indium antimonide, indium antimonide or another semiconductor material.
6. (Currently amended) A method according to claim [[1]] 21 in which the resist material is deposited by evaporation, sputter deposition, or chemical vapour deposition.
7. (Currently amended) A method according to claim [[1]] 21 in which the resist material comprises aluminum.
8. (Currently amended) A method according to claim [[1]] 21 in which the removal of the coated hemispherical structures is achieved by a lift-off process

which comprises submerging the structure in an ultrasonic agitation bath filled with solvent, whereby the islands are dissolved and their coatings detached, leaving a perforated film over the remainder of the substrate to act as an etchant resist.

9. (Currently amended) A method according to claim ~~[[1]]~~ 21 in which the etching is achieved by directional etching such as reactive ion etching or laser etching to make well-like structures.

10. (Currently amended) A method according to claim ~~[[1]]~~ 21 in which the evaporation of resist material is achieved by directing the vapour stream at a grazing angle of incidence to the substrate, so that each island casts a shadow in which there is no vapour deposition, whereby the holes remaining in the film after removal of the hemispherical structures will be elongated.

Claims 11-16 (Canceled)

17. (Currently amended) A crystalline heterostructure formed by the method of claim ~~[[11]]~~ 21 in which one of the materials is a semiconductor and one is an insulator, the structure being arranged to form a gate dielectric device, or an integrated optical waveguide device, or a surface acoustic wave delay line together with associated circuitry as required.

18. (Original) A structure according to claim 17 in which the insulator has a high dielectric constant.

19 - 20. (Canceled)

21. (Previously presented) A method of forming an array of features comprising:

- (a) depositing a film of a soluble solid onto a surface of a hydrophilic substrate;
- (b) exposing the film to solvent vapour so that the film reorganises into an array of discrete hemispherical islands on the surface;

- (c) depositing a film of a resist material over the surface, the film having a thickness of less than a fifth of an average diameter of the islands;
- (d) removing the hemispherical structures together with their coating of resist leaving a resist layer with an array of holes corresponding to the islands; and
- (e) subjecting the resulting structure to an etching process so as to form a well at the position of each hole.

22. (Previously presented) A method of forming an array of features comprising:

- (a) depositing a film of a soluble solid onto a surface of a hydrophilic substrate;
- (b) exposing the film to solvent vapour so that the film reorganises into an array of discrete hemispherical islands on the surface;
- (c) depositing a film of a resist material over the surface by directing a vapour stream of resist material at a grazing angle of incidence to the surface;
- (d) removing the hemispherical structures together with their coating of resist leaving a resist layer with an array of holes corresponding to the islands; and
- (e) subjecting the resulting structure to an etching process so as to form a well at the position of each hole.

23. (Previously presented) A method according to claim 22, wherein the islands cast a shadow in which there is no vapour deposition.

24. (Canceled)

25. (New) A method of forming a crystalline heterostructure comprising two component materials having different lattice structures, in which the materials are arranged to contact each other via a plurality of discrete regions, the method comprising the steps of:

- (a) forming a layer of the first material;
- (b) forming an insulating layer on the surface of the first material so as to provide a hydrophilic substrate;
- (c) depositing a film of a soluble solid onto a surface of the hydrophilic

substrate;

- (d) exposing the film to solvent vapour so that the film reorganises into an array of discrete hemispherical islands on the surface;
  - (e) depositing a film of a resist material over the surface;
  - (f) removing the hemispherical structures together with their coating of resist leaving a resist layer with an array of holes corresponding to the islands;
  - (g) subjecting the resulting structure to an etching process so as to form a well at the position of each hole; and
  - (i) growing crystals of the second material on the first material in the regions exposed by the holes so as to form an island at the position of each hole;
- wherein said two component materials are both metals.

26. (new) A method of forming a crystalline heterostructure comprising two component materials having different lattice structures, in which the materials are arranged to contact each other via a plurality of discrete regions, the method comprising the steps of:

- (a) forming a layer of the first material;
  - (b) forming an insulating layer on the surface of the first material so as to provide a hydrophilic substrate;
  - (c) depositing a film of a soluble solid onto a surface of the hydrophilic substrate;
  - (d) exposing the film to solvent vapour so that the film reorganises into an array of discrete hemispherical islands on the surface;
  - (e) depositing a film of a resist material over the surface;
  - (f) removing the hemispherical structures together with their coating of resist leaving a resist layer with an array of holes corresponding to the islands;
  - (g) subjecting the resulting structure to an etching process so as to form a well at the position of each hole; and
  - (i) growing crystals of the second material on the first material in the regions exposed by the holes so as to form an island at the position of each hole;
- wherein at least one of the two component materials is a metal compound comprising MaAs, MnSb, NiMnSb, PtMaSb, CuMnSb, LuPdSb, CO<sub>2</sub>MnGe, or CrO<sub>2</sub>.